

seeks safety by running under some convenient cover instead of by flight.

These notes seem to indicate that, while some species are confined to midsummer, most of the Pine Barren *Cicindelæ* appear late in the summer and continue until fall, when they hibernate in the sand and reappear early in spring; Mr. H. W. Wenzel informs me that many species recorded at Lakehurst on April 10 and April 15 have been found at Da Costa on March 16 when there was still snow on one side of the railroad cut in which they were found. The indications that some individuals hibernate are indeed very strong; but it may well be that others do not complete their transformation until spring and then join their more expeditious brethren to make up the greater spring abundance of specimens.

CLASSIFICATION OF THE POINTED-TAILED WASPS, OR THE SUPERFAMILY PROC- TOTRYPIDÆ.—I.

BY WILLIAM H. ASHMEAD, A.M.,

ASSISTANT CURATOR, U. S. NATIONAL MUSEUM, WASHINGTON, D. C.

The writer, in his attempt towards a more natural classification of the Hymenoptera, in the Journal of the New York Entomological Society for March, 1899, separated these insects into *ten* superfamilies, namely: I, Apoidea; II, Sphecoidea; III, Vespoidea; IV, Formicoidea; V, Proctotrypoidea; VI, Cynipoidea; VII, Chalcidoidea; VIII, Ichneumonoidea; IX, Siricoidea, and X, Tenthredinoidea, which he considered were large natural groups, the sequence so arranged to show, as nearly as it were possible in a tabular arrangement, their affinities and relationship.

The new scheme of arrangement has been most favorably received notwithstanding its incompleteness, since only a few of these superfamilies have as yet been treated in toto and it is hardly possible yet, except in the vaguest way, for the student to appreciate the merits of the system in its entirety.

Of these ten superfamilies I have now classified down to genera, the Apoidea, the Sphecoidea, the Vespoidea, the Chalcidoidea,* the Ich-

* To be published shortly by the Carnegie Museum, Pittsburgh, Pa.

neumonoidea, the Siricoidea and the Tenthredinoidea. The Formicoidea, the Proctotrypoidea and the Cynipoidea still remain to be treated.

In the present paper, or rather series of papers, I propose to give my ideas on the classification of one of these remaining superfamilies—the PROCTOTRYPOIDEA.

It has been just ten years since I wrote my monograph on the North American Proctotrypidæ. During these years I have made laborious studies into all the families of the Hymenoptera, and it is only natural, therefore, that my ideas and views should broaden and change with increased knowledge, that I should now see more clearly affinities and relationship in groups not before noticed, and that my conception of what constituted a family, still a vague term, should be modified.

In my opinion, the old conception of the family Proctotrypidæ was erroneous in some particulars; it was a complex group and represented more than a family; it really represented a superfamily, with many families. Some of the forms, too, classified as Proctotrypids, had no relation whatever with these insects, while others, placed elsewhere, the Pelecinidæ, *Monomachus*, etc., were in reality genuine Proctotrypoids and should have been classified with them.

The subfamilies Bethylinæ, Emboleminæ and Dryininæ, too, as I have shown elsewhere, really represent a natural family of higher rank far removed from genuine Proctotrypoids, and belong among the Aculeata or Fossores.

These remarks will suffice to introduce and account for the changes made in the classification of this great complex.

CLASSIFICATION.

Superfamily V. PROCTOTRYPOIDEA.

Table of Families.

- | | | |
|----|--|---|
| 1 | Trochanters distinctly <i>two</i> -jointed..... | 2 |
| | Trochanters <i>1</i> -jointed. | |
| | Antennæ 14-jointed, inserted on the middle of the face; front wings with a lanceolate stigma, the marginal cell long, open at apex; mandibles dentate; maxillary palpi 5-; labial palpi 3-jointed; ♀ abdomen greatly elongated, slender and cylindrical, about five times the length of the head and thorax united, composed of six segments; ♂ abdomen clavate. | |
| | Family L. PELECIDÆ. | |
| 2. | Antennæ inserted at the clypeus..... | 6 |
| | Antennæ inserted on the middle of the face, often on a frontal prominence. | |

- Wingless forms..... 5
 Winged forms..... 3
3. Front wings with the marginal vein linear, never stigmated..... 4
 Front wings with the marginal vein stigmated, or with a distinct stigma.
 Mandibles dentate; antennæ 14- or 15-jointed; claws simple or pectinate; hind wings with a more or less distinct venation.....Family LI. ITELORIDÆ.
 Mandibles edentate; antennæ 13-jointed with one ring-joint (12-jointed without ring-jointed); claws simple; hind wings without a distinct venation.
 Family LII. PROCTOTRYPIDÆ.
4. Front wings with a distinct basal cell and usually with a distinct marginal cell, the latter never wholly wanting although often incomplete; hind wings always with a basal cell; antennæ 14-15-jointed; labial palpi 3-jointed.
 Family LIII. BELYTIDÆ.
 Front wings rarely with a distinct basal cell, the median vein most frequently obsolete or subobsolete, the marginal cell never complete, usually wholly wanting; hind wings always without a basal cell; antennæ 11- to 14-jointed; labial palpi 2-jointed.....Family LIV. DIAPRIIDÆ.
5. Mandibles edentate; tip of abdomen stylate.....Family LII. PROCTOTRYPIDÆ.
 Mandibles dentate; tip of abdomen not stylate.
 Labial palpi 3-jointed.....Family LIII. BELYTIDÆ.
 Labial palpi 2-jointed.....Family LIV. DIAPRIIDÆ.
6. Wingless forms..... 8
 Winged forms.
 Abdomen acute or margined along the sides and sessile or subsessile..... 7
 Abdomen rounded at sides, never acute or margined; front tibiæ with the apical spur, strongly forked; antennæ in ♀ 10- or 11-jointed, in ♂ 11-jointed; front wings always without a postmarginal vein, the stigmal vein long, the marginal vein either linear or stigmated.....Family LV. CERAPHRONIDÆ.
7. Front wings most frequently with marginal and stigmal veins; antennæ usually 12-jointed in both sexes, sometimes in ♀ 11-jointed, or 7-jointed when the club joints coalesce and form a single large joint.....Family LVI. SCELIONIDÆ.
 Front wings always without marginal and stigmal veins and most frequently entirely veinless, at most with only a submarginal or subcostal vein, which is sometimes clavate at apex; antennæ never more than 10-jointed, usually with the same number of joints in both sexes, rarely only 8- or 9-jointed.
 Family LVII. PLATYGASTERIDÆ.
8. Abdomen along the sides rounded, not acute or margined; front tibiæ with the apical spur strongly forked.....Family LV. CERAPHRONIDÆ.
 Abdomen with the sides acute or margined; front tibiæ with one spur.
 Antennæ 12-jointed, or if with a solid club 7-jointed; labial palpi two-jointed or more.....Family LVI. SCELIONIDÆ.
 Antennæ 10-jointed or less; labial palpi 1-jointed.
 Family LVII. PLATYGASTERIDÆ.

Family L. PELECINIDÆ.

This family is represented by a single genus, with several species, confined to the New World, *i. e.*, North and South America.

Our common species, *Pelecinus polyturator* Drury, is not rare in some of the Northern States, in August and September, and the female forms a conspicuous object when flying, since its flight is slow and difficult on account of its abnormally lengthened abdomen. The male, on the contrary, is extremely rare and exceeding rapid in flight. It is sharp-eyed, takes flight rapidly and is rarely captured.

According to Prof. S. A. Forbes, *P. polyturator* Drury, lives parasitically upon the larvæ of our May beetles (*Lachnosternæ*).

Antennæ 14-jointed, inserted on the middle of the face.

Abdomen in ♀ very long, cylindrical, several times longer than the thorax, in ♂ clavate.....**Pelecinus** Latreille (type *Ichneumon polyturator* DRURY).

Family LI. HELORIDÆ.

This family is readily distinguished by the characters made use of in my table of families. It forms a connecting link between the family Pelecinidæ, probably the oldest type of a Proctotrypid, and the Proctotrypidæ and the Belytidæ.

The Helorinæ attack the golden-eyed flies, Chrysopidæ, while the Monomachinæ, I suspect, are parasitic upon ant-lions, Myrmeleonidæ.

TABLE OF SUBFAMILIES.

Claws simple; basal nervure normal, not broken; abdomen longly petiolated; antennæ 14-jointedSubfamily I. MONOMACHINÆ.

Claws pectinate; basal nervure abruptly broken and bent downwards forming a triangular discoidal cell; antennæ 15-jointed.....Subfamily II. HELORINÆ.

Subfamily I. MONOMACHINÆ.

Table of Genera.

Front wings with only one discoidal cell, the first absent; apex of metathorax strongly produced beyond the insertion of the hind coxæ; body of abdomen in the female strongly compressed, long, narrow, lanceolate, in male fusiform, head with temples and cheeks strongly buccate; scape of antennæ rather long.

Monomachus Westwood (type *M. gladiator* (KLUG) WESTWOOD).

Front wings with two discoidal cells, the first present; apex of metathorax truncate; body of abdomen in ♂ compressed, as seen from the side triangular or pyriform in outline; head not buccate; scape of antennæ short.....**Roptronia** Provancher (type *R. pediculata* PROV.).

Subfamily II. HELORINÆ.

Only a single genus is known in this subfamily which may be recognized by the following characters:

Antennæ 15-jointed, the scape short; abdomen ovate or oblong-oval, the second very large; claws pectinate.....**Helorus** Latreille (type *Sphex anomalipes* PANGER).

Family LII. PROCTOTRYPIDÆ.

This family is parasitic upon the larvæ of beetles and is easily separated from all the other families by the edentate mandibles and by abdominal peculiarities; the abdomen in the females terminates in a stylus or cauda, in the males in two spines or

prongs. The antennæ are 13-jointed, with *one* ring joint, in both sexes, the scape very short, oval, the pedicel very minute and often more or less hidden within the apex of the scape.

Table of Genera.

1. Males; abdomen ending in two prongs or spines..... 3
 Females; abdomen ending in a stylus or cauda.
 Wingless forms..... 2
 Winged; maxillary palpi 4-jointed, the last joint linear.
 Mesonotum with distinct parapsidal furrows **Disogmus** Förster
 (type *Proctotrypes areolatus* HAL.).
 Mesonotum without parapsidal furrows..... **Proctotrypes** Latreille.
 (type *Ichneumon gravidator* LINNÉ).
2. Metathorax smooth; maxillary palpi short, 3-jointed, the last joint subclavate.
 Codrus Jurine (type *Proctotrypes apterogynus* HAL.).
3. Metathorax rugose or areolate; maxillary palpi 4-jointed.
 Mesonotum with parapsidal furrows..... **Disogmus** Förster.
 Mesonotum without parapsidal furrows..... **Proctotrypes** Latreille.
 Metathorax smooth, exareolate; maxillary palpi 3-jointed..... **Codrus** Jurine.

Family LII. BELYTIDÆ.

The venation, which is quite distinct from the other families, distinguishes the family. The antennæ are perfect, inserted on a frontal prominence, filiform, setaceous or subclavate, and 14- or 15-jointed, with a long scape; mandibles usually short, with a tooth within, rarely falcate and decussate; maxillary palpi 4 or 5-jointed; labial palpi 3-jointed; legs rather long and slender, the tibial spurs 1, 2, 2, the tarsi long and slender, 5-jointed, the claws always simple; while the abdomen is variable in shape but always distinctly petiolate.

The family comes quite close to the Diapriidæ but is easily separated by having 3-jointed labial palpi and by the venation of the hind wings, which have a basal cell.

The group is supposed to be parasitic upon Dipterous larvæ inhabiting fungi. *Betyla fulva* Cameron is recorded from *Bolitophila luminosa*.

Table of Genera.

1. Females..... 2
 Males..... 18
2. Antennæ 13-jointed..... 17
 Antennæ 14- or 15-jointed.
 Antennæ 15-jointed..... 3
 Antennæ 14-jointed..... 16
3. Abdomen with more than 4 dorsal segments..... 6
 Abdomen with 3 or 4 dorsal segments.
 Marginal vein not or scarcely longer than the marginal cell..... 4
 Marginal vein more than twice the length of the marginal cell.
4. First funicle joint not unusually long..... 5
 First funicle joint unusually long, nearly as long as all the rest of the joints united, the intermediate joints transverse-moniliform.

Macrohynnis Förster (type unknown).

Diphora Förster (type *D. westwoodi* FÖRST.).

5. Abdomen with three, rarely with 4 dorsal segments, the second not greatly lengthened, the third long and strongly compressed at sides; marginal vein not shorter than the marginal cell; antennæ filiform, pubescent, the funicular joints all long.
Leptorhaptus Förster (type *L. abbreviatus* FÖRSTER).
 Abdomen with 3 dorsal segments, the second very much lengthened, nearly extending to the tip of the abdomen, the third issuing from it as a short stylus; marginal vein usually distinctly shorter than the marginal cell, antennæ filiform, pubescent, the 5 or 6 terminal joints oval, the others long.....**Miota** Förster (type unknown).
6. Abdomen with 7 or 8 dorsal segments..... 7
 Abdomen with 5 or 6 dorsal segments, long and slender.
 Abdomen with 5 segments, the last three long and slender, together as long as the second and resembling the terminal segments of a scorpion; antennæ long, filiform.....**Scorpioteleia** Ashmead. (Type *S. mirabilis* ASHM.).
 Abdomen with 6 segments, the tip curving upwards, the second segment hardly longer than the long petiole, dorsally triangularly excised at apex, the third a little longer than 4 and 5 united, the last conical; antennæ filiform, the last joint ovate, stouter and about as long as the two preceding joints united.
Stylidodon Ashmead (type *S. politum* ASHM.).
7. Winged forms; thorax normal; ocelli present.....7½
 Wingless; thorax narrow, attenuated; head oblong oval; ocelli wanting.
Betula Cameron (type *B. fulva* CAM.).
- 7½. Abdomen with 8 dorsal segments..... 9
 Abdomen with 7 dorsal segments.
 Antennæ clavate-moniliform, the first funicle joint slightly longer than the pedicel, all the others to the last, moniliform, the last enlarged, oval; first abscissa of the radius usually straight, rarely very oblique.
Acropiesta Förster (type *A. collaris* FÖRST.).
9. Eyes bare..... 15
 Eyes hairy.
 Middle carina of metanotum not divided..... 10
 Middle carina of metanotum divided, or wanting.....**Belyta** Jurine (type *B. bicolor* JURINE).
10. Postscutellum normal, unarmed..... 11
 Postscutellum armed with a strong thorn or spine.....**Oxylabis** Förster (type *Belyta bisulca* NEES.).
11. Third dorsal segment of abdomen not, or very little, longer than the fourth.. 12
 Third dorsal segment of abdomen much longer than the fourth.
 Mandibles short, small; marginal vein as long as the marginal cell; antennæ filiform, pubescent, the last flagellar joint more than twice as long as thick.
Cinetus Jurine (type unknown.)
 Mandibles long, falcate, decussate; marginal vein shorter than the marginal cell; last funicular joint not more than twice as long as thick.
Xenotoma Förster (type *Belyta bicolor* NEES.).
12. Marginal cell open at apex..... 13
 Marginal cell closed.

First abscissa of the radius straight from the margin, shorter than the marginal vein; funicular joints only slightly shortening.....**Zelotypa** Förster (type unknown).

First abscissa of the radius oblique, usually longer than the marginal vein; funicular joints strongly shortening, the apical joints wider than long.

Pantoclis Förster (type *Belyta brevis* NEES).

13. Stigmal vein very short, with an uncus, marginal vein as long as the basal nervure 14

Stigmal and postmarginal veins much shortened but distinct.

Stigmal vein originating at almost a right angle; antennæ filiform, funicle joints 2-12 transverse moniliform, the pedicel obconical.

Zygota Förster (type *Belyta abdominalis* NEES).

Stigmal vein originating at a very oblique angle; antennæ clavate, moniliform, the first funicle joint only a little longer than thick and smaller than the pedicel **Aclista** Förster (type unknown).

14. Mandibles conical, not rostriform; palpi 4-jointed; scape at tip produced into a little spine **Synacra** Förster (type *Diapria brachialis* NEES).

15. Mesonotum with distinct parapsidal furrows; marginal cell long, open; antennæ clavate, moniliform, the first funicle joint slightly longer than the pedicel.

Psilomma Förster (type unknown).

Mesonotum without parapsidal furrows; marginal cell not long and closed; antennæ subfiliform **Ismarus** Haliday (type *I. dorsiger* CURTIS).

16. Wingless; ocelli wanting **Anommattium** Förster (type unknown).
Winged; ocelli present.

Marginal cell distinct, closed; antennæ filiform or subclavate.

Anectata Förster (type unknown).

Marginal cell wanting or only slightly developed; antennæ subclavate, moniliform, pubescent, the first joint of funicle smaller than the pedicel..... **Pantolyta** Förster (type *Belyta heterocera* HAL).

17. Parapsidal furrows obsolete; angles of metathorax spined.

Malvina Cameron (type *M. punctata* CAM).

18. Petiole of abdomen nearly twice as long as the metathorax..... 19

Petiole of abdomen not, or scarcely, longer than the metathorax..... 21

19. Marginal vein not twice as long as the marginal cell..... 20

Marginal vein twice as long as the marginal cell.....**Macrohynnis** Förster.

20. Second abdominal segment compressed laterally; petiole above smooth.

Antennæ filiform, the scape as long as the first funicular joint, the latter strongly emarginate at base **Leptorhaptus** Förster.

Antennæ filiform, pubescent, the scape shorter than the first funicular joint, the latter not so strongly emarginate at base.....**Miota** Förster.

Second abdominal segment not compressed laterally, the abdomen becoming more flattened behind this segment, the petiole above more or less furrowed; scape longer than the first funicle joint.....**Cinetus** Jurine.

21. Middle carina of metathorax not divided 22
Middle carina of metathorax divided or absent.

- Marginal vein scarcely longer than the stigmal, the marginal cell long; antennæ filiform, all the joints long, cylindrical, the first funicular joint emarginate at base.....**Belyta** *Jurine*.
22. Postscutellum without a spine.....**Oxylabis** *Förster*.
Postscutellum with a spine or thorn..... 24
23. Eyes hairy..... 24
Eyes bare..... 29
24. Scape normal, not produced on one side into a tooth at apex..... 25
Scape abnormal, the apical margin on one side produced into a tooth; marginal cell closed.....**Acropiesta** *Förster*. 26
25. Marginal cell completely closed..... 26
Marginal cell open or wanting..... 28
26. Marginal vein at least twice as long as the first abscissa of the radius (stigmal vein)..... 27
Marginal vein not or only a little longer than the first abscissa of the radius, the latter usually oblique.
Marginal cell abnormally large, lanceolate, extending nearly to the tip of the wing.
Marginal cell normal.....**Betyla** *Cameron*.
Last ventral segment straight and punctate.
Front tibiæ normal**Anectata** *Förster*.
Front tibiæ bent with a spined process near the middle.
Zygota *Förster*.
Last ventral segment somewhat bent, impunctate....**Pantoclis** *Förster*.
27. First abscissa of the radius (the stigmal vein) straight or perpendicular, forming a right angle with the margin, rarely slightly oblique.....**Zelotypa** *Förster*.
28. Marginal cell more or less present.
Marginal cell much lengthened; front tibiæ bent and outwardly on side near the middle, produced into a tooth or spine.....**Zygota** *Förster*.
Marginal cell not much lengthened; front tibiæ normal.....**Aclista** *Förster*.
Marginal cell wanting.
Basal nervure distinct; antennæ filiform, pubescent, the joints lengthened, the first flagellar joint twice as long as the pedicel and slightly emarginate at base.....**Pantolyta** *Förster*.
29. Mesonotum with parapsidal furrows; marginal cell long, open; antennæ stout, filiform, the first flagellar joint longer than the second, slightly emarginate at base, the joints after the second hardly twice as long as thick.
Psilomma *Förster*.
Mesonotum without parapsidal furrows; marginal cell closed; antennæ filiform, not stout, the first flagellar joint shorter than the second....**Ismarus** *Haliday*.